



Natural selection and functional genetic variation in the p53 pathway

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Abstract:

The allele frequencies of two functional single-nucleotide polymorphisms (SNPs) in the p53 pathway, the MDM2 SNP309 and TP53 Arg72Pro, vary dramatically among populations. That the frequencies of the TP53 SNP follow a clinal distribution may suggest that selective pressure from environmental variables correlated with latitude contributed to these observed population differences. Recently, winter temperature and UV radiation were found to be significantly correlated with the TP53 and the MDM2 SNPs, respectively, in East Asians; whether these correlations are more extreme than expected based upon nonselective factors such as patterns of human migration remains unclear. Here, we genotyped these two SNPs in 971 unrelated individuals from 52 unique populations worldwide and tested for correlations with both latitude and a number of climate-related environmental variables on a global scale, controlling for these neutral processes. The TP53 SNP was associated with a significant selection signal for a few climate variables, such as short-wave radiation flux in the winter, but these signals were no longer significant after correction for multiple tests. The MDM2 SNP did not exhibit a significant signal with any climate variable. Therefore, these SNPs are unlikely to be under selective pressure driven by these variables. Thus, these data underscore the need to incorporate population history when assessing signatures of selection.

Source: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3063984>

Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Solar Radiation, Temperature

Temperature: Fluctuations

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location:

resource focuses on specific location

Global or Unspecified



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Health Impact:

specification of health effect or disease related to climate change exposure

Cancer

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content